JET PROPULSION LABORATORY

INTEROFFICE MEMORANDUM
IOM 368-01-001/ECH
September 10, 2001

TO: Eugene Burke

FROM: Earnestine Hampton

SUBJECT: The benefit of using Foreign Apertures in support of MER-A and MER-B Project for planned daily Delta-DOR support from 1 December 2003 through 25 January 2004.

REFERENCE: Telecom with D. Morris on 8/30/01, "if other outside antenna were used to support the MER-A and MER-B daily Delta-DOR requirements, what missions would benefit from the unused DSN antenna time?"

The purpose of this memorandum is to evaluate the effect of the current plan to use non-DSN apertures to support the MER-A and MER-B daily Delta-DOR requirements on the Deep Space Network and other users of these resources.

MER-A and MER-B PLANNED DELTA-DOR REQUIREMENT

The planned Delta-DOR requirement is for a 1hour support for 56 consecutive days. The planned Delta-DOR scenario is a 10-hour Goldstone support over-lapped by 1 hour at the beginning of track with Madrid support and over-lapped by 1-hour at the end of track with a Canberra support. The requirement is for two daily Delta-DOR supports using this scenario from 1 December 2003 through 25 January 2004. This equates to approximately 112 Delta-DORs during the 56 days of high activity for MER-A and MER-B.

COST TO THE DSN TO USE OUTSIDE APERTURES

Using non-DSN antenna for approximately two 2- to 4-hours for 56 consecutive days will release approximately one to two hours of tracking time within the Mars view on the Deep Space Network at Madrid, Spain and Canberra, Australia. However, the Goldstone support will be extended to daily 9 to 11 hour supports or s/c rise to s/c set to support the planned multiple Delta-DOR activities with other foreign assets. The total number of hours utilized on the non-DSN antenna is approximately 336 hours (using 3-hours per Delta DOR). This includes additional time for set-up, pre-calibration, post calibration, and post pass data playback.

The impact of using other foreign assets will affect the European VLBI Network, EVN, Ground Base Radio Astronomy, RA500, VLBA, Radio Stars, etc. The cost to the DSN will be approximately ten 24-hour days of support for these activities leveled on the current DSN requirement of 1220 hours per year. Also, there is the cost of upgrading and

certification of the non-DSN apertures/equipment to be compatible with the Deep Space Networks.

BENEFIT TO MARS MISSIONS AND OTHER USERS

The extra hours per day made available at the overseas Deep Space Networks can be used to monitor the downlink characteristics of the spacecraft or utilized by other Projects that share the Mars view. The Projects that can benefit from this extra hour per day are:

CANBERRA	**MADRID**
DSS Maintenance	Microwave Anisotropy Probe
Stardust	Space Infrared Telescope
Genesis	Cassini
Space Infrared Telescope	Deep Impact
Voyager 2	

SUMMARY

The use of foreign apertures to reduce the over-subscription of the Deep Space Network during the MER-A and MER-B 56 consecutive days of high activity, from 1 December 2003 through 25 January 2004 will: (1) benefit other Deep Space Network users sharing the Mars view or (2) reduce the error margin for MER-A and MER-B by monitoring the s/c telemetry modes and certify that the telecom links are performing correctly.

The cost of using foreign assets will require the DSN to make available 336 hours to the European VLBI Network. Each of these activities requires 8-24 hours of track time and currently places a difficult strain on the Deep Space Network. The cost of using foreign assets will also require the upgrade of the equipment and the additional cost in time to certify the compatibility of these antenna.

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